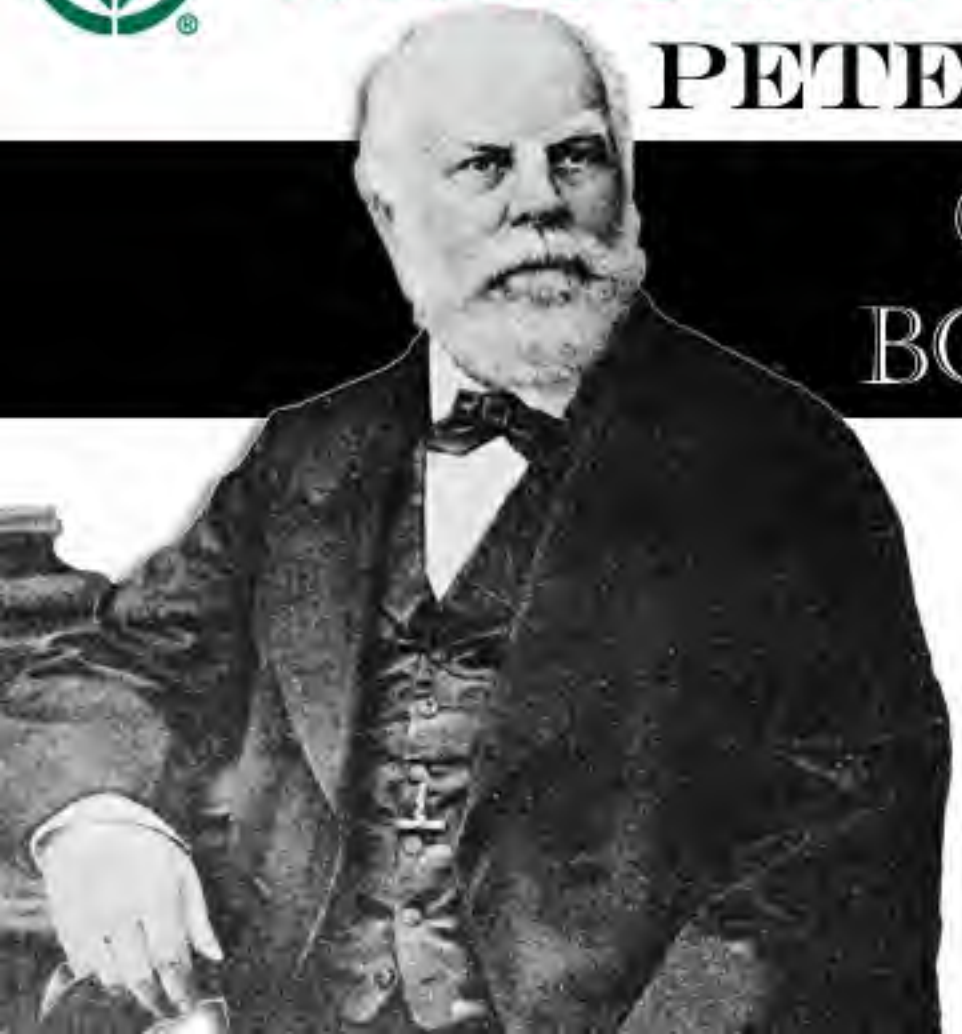
Missouri Botanical Garden
Peter H. Raven Library

George Engelmann Botanical Notebooks



Pagination Note:
Since many of the items lack a specific page number, the page number displayed online refers to the sequentially created number each item was given upon cataloging the materials.

14416

Appendix A.

From the Report on the Botany of the Expeditions of Capt J. H. Simpson, Topl Engrs U S Army,

in 1858 & 1859,

by

Dr. George Engelmann,

naked upwards, bearing strict, rather compact paniculate spike

Appendix

Lt. J. H. Simpson
Topl. Engineers. U.S.A.
Commanding Expedition

Dear Sir,

Want of time
very rich botanical
by my brother, Henry
of your expedition
herewith enclose to
to have a particular

spect to continue
n through you, to

Very

December 31st 1860.

Printer.

succeeding pages,
the top of one page,

g, bearing strict,

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Appendix M.

Capt. J. H. Simpson
Topl. Engineers. U.S.A.
Commanding Expedition

Dear Sir,

Want of time has prevented me fully to elaborate the very rich botanical material, brought together, under your orders, by my brother, Henry Engelmann, the Geologist and Meteorologist of your expedition.

I herewith enclose to you an account of a few species, which seem to have a particular and principally a practical interest.

I expect to continue my investigations and hope to submit them through you, to the scientific public, at a future period.

Very respectfully &c
George Engelmann

St. Louis, Decembr. 31st 1860.

Note for the Printer.

On the succeeding pages, "Appendix M continued" to be printed at the top of one page, and "Botany" on the other.

naked upwards, bearing strict, rather compact paniculate spikes

Appendix
the Reports of the
Wilkes, U. E. U. S. A. 185

Rosac

...rophus ledifolius, Nutta
...tion of Michaux' Sylva, 2. p
Mountain Mahogany of t
...ibed by Nuttall in both
...however, is not a very
...tree
...high and that the trunk
...trees found to grow rare
...stems from one root; its
...taken ~~up~~ of 3 — 6 or
...~~about~~ 10 inch
...th, with superficial longi
...ard, heavy, very close gr
...very numerous but extremely
...lar to cherry wood but
...ines, 4 lines of which are w
...ness of not much more
...smooth bark with joint
...wer; are usually crowde
...inches in length, closely
...ersistent, lanceolate, ac
...the midrib prominent on t
...petiole 1½ — 2 lines in le
...two scarious stipules. U
...with short curly hair;
...face, the lower remainin
...duced in June from the
...either single or 2 or 3 tog
...ical woolly calyx tube
...gs, bearing strict,

(Printer not paid 5 pages)

Appendix M.

From the Report of the Botany of the Expeditions of Capt. J. H. Simpson, C. E, U. S. A. 1858-59, by Dr. George Engelmann.

Rosaceae

Cercocarpus ledifolius, Nuttall in Torrey and Gray's Fl. N. Am. 1 p. 427 and in his Continuation of Michaux' Sylva, 2. p. 28. t. 51; Hooker, ic. pl. t. 324, ined. fide Torr. & Gr. l.c.; Mountain Mahogany of the inhabitants of Utah. - This small evergreen tree is so well described by Nuttall in both works, mentioned, that not much remains to be added; his figure, however, is not a very faithful representation. She says that it grows much like a peach tree at most 15 feet high and that the trunk is sometimes as much as a foot in diameter. On the Expedition it was found to grow rarely as a tree, but usually branching from the base, or several stems from one root; its height was from 8 to 15 feet, and the stems (each a thickness of 3-6 or at most 10 inches in diameter. The bark is light gray, tough, smoothish, with superficial longitudinal wrinkles and short transverse scars. The wood is hard, heavy, very close grained, light reddish brown with white sap; medullary rays very numerous but extremely fine, scarcely visible with the naked eye; the wood is similar to cherry wood but harder and heavier. A specimen before me has a diameter of 16 lines, 12 lines of which are wood, showing 24 annual rings, so that each ring has a thickness of not much more than 1/4 line. The shoots or longer branches have a white smooth bark with joints or internodes of about 1 inch in length. The leaves, however, are usually crowded at the end of lateral branchlets, a few lines to 1 or 1 1/2 inches in length, closely covered with circular scars. Leaves very thick and leathery, persistent, lanceolate, acute at both ends, entire and revolute at the margin, with a thick midrib prominent on the lower surface, 9-14 lines long, 2 1/2-3 1/2 lines wide, on a petiole 1 1/2-2 lines in length, to the lower part of which adhere lanceolate brown scarious stipules. When young the branchlets as well as the leaves are covered all over with short curly hair; when older, the leaves become glabrous and glossy on the upper surface, the lower remaining hairy and assuming a rusty color. The sessile flowers are produced in June from the axils of the uppermost leaves of the preceding year's growth, either single or 2 or 3 together; short scarious bracts envelop the base of the cylindrical woolly calyx tube, which is 3 lines long; its 5-lobed white limb

naked upwards, bearing strict, rather compact paniculate spikes

ter, is very woolly external
laments with reniform an
feathery style becomes cl
t maturity the style bec
mspicuous linear, hairy
rt calyx tube; at its
g, less than a line in le
ntles. The fruit
llected in spring before
young leaves begin to
them and the leaves of t
rowth at the end of each
nths old.
fine tree, discovered
hear "Thornberg's R
on the Lookout Mo
g. bearing strict,

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

3-4 lines in diameter, is very woolly externally and less so internally, and bears about 20 or 25 naked slender filaments with reniform anthers, 1/2 line in diameter. Immediately after flowering the silky-feathery style becomes elongated and carries up with it the detached limb of the calyx; at maturity the style becomes a twisted, feathery tail of about 2 inches in length; the inconspicuous linear, hairy fruit itself is about 4 lines long and remains hid in the persistent calyx tube; at its top and base I observe a beard of very curious stiff white bristles, less than a line in length, thicker in the middle and tapering towards both extremities. The fruit seems to be somewhat persistent, as I find it in specimens collected in spring before the flowering season. About the time of flowering the young leaves begin to develop at the end of the branchlets, leaving the flowers between them and the leaves of the year before. I generally find 4 or 5 leaves of the same year's growth at the end of each branchlet; they probably fall off when about 15 or 18 months old.

This fine tree, discovered by Nuttall on Bear River, north of the Salt Lake, and near "Thornberg's Ravine" in the Rocky Mountains, was found by the Expedition on the Lookout Mountains and other Mountain chains of the Basin.

G. Engelmann.

naked upwards, bearing strict, rather compact paniculate spikes

Report on the Botan

Wilson. T. E. U. S

St. Louis.

Cactaceae

ical limits of the
considerably enlarged
st least 7 species
t parallel, viz: 2
veral species, known
nd 3 new and very
Echinocacti and

ivipara. Hawarth.
554; Englm. Synopsis
p. 295. In the So
seen no specimens
side of the mou

Simpsoni. (Sp
basi turbinatis ma
laxis ovatis ap
ibus leviter compre
compressis basi
ceolatis, nascenta

s, bearing strict, ro

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

4 C

1

From the report on the Botany of the Expeditions of Capt J. H. Simpson, T. E. U. S. A. 1858-59, by Dr George Engelmann, of St Louis.

Cactaceae

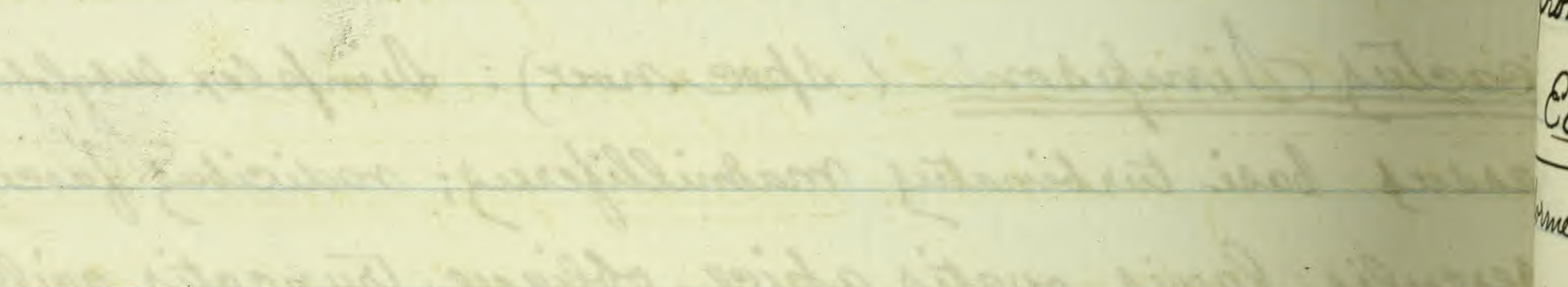
The geographical limits of the area of this Curious American family have been considerably enlarged by the expedition, proving the presence of at least 7 species in the Utah-basin. between the 38th and 40th parallel, viz: 2 Echinocacti, 1 Cereus and 4 Opuntiae. Several species, known before, have been found in new localities and 3 new and very distinct species have been discovered; 2 Echinocacti and 1 Opuntiae.

Mamillaria vivipara. Haworth, Suppl. p. 72; Torrey and Gray, Fl. N. Am. 2. p. 554; Englm. Synops. Cact. p. 13; Cactus viviparus Nuttall; gen. 1. p. 295. In the South Pass and on Sweet water river. I have seen no specimens of this wide spread species from the other side of the mountains.

Echinocactus Simpsoni. (Spec. nov.): Simplex subglobosus seu depressus basi turbinatus mamilliferus; radicibus fasciculatis; tuberculis laxis ovatis apice oblique truncatis axilla nudis, junioribus leviter compressis basi deorsim productis, vetustioribus obcompressis basi dilatatis; areolis ovatis seu ovato-lanceolatis, nascentibus albo-villosissimis mox

naked upwards, bearing strict, rather compact paniculate spike

exterioribus sub- 2
dictis supra aculeo
ibus obscuris ere
aculeis contigu
ibus; ovario abbre
simis (1-3) instru
s orbiculatis seu o
fimbriatis, sepal
petalis 12-13 ob
x virescente ro
ctis; bacca par
ata squamis
e marcescente de
d folliculi mo
gnis obovatis ob
ato subbasilari
circumvoluto ha
B. minor: tota pl
minoribus.
tte valley in the
west; fl. in M
from the Pikes
Echinocanthus
merly described as Mo
ps. Cact. p. 8, proves
amination of Mr Fe
ular joins the spinife
it is remarkable tha
s, bearing strict, ra



radatis; aculeis exterioribus sub-20 radiantibus tenuibus rigidis rectis albidis, addictis supra aculeis 2-5 setaceis brevibus interioribus 8-10 robustioribus obscuris erecto-patulis; areola florifera subtuberculi apice aculeis contigua circulari; floribus in vertice dissitis minoribus; ovario abbreviato squamis sepaloideis triangulatis paucissimis (1-3) instructo; sepalis tubi brevis late infundibuliformis orbiculatis seu ovatis obtusis membranaceo-marginatis crenulatis fimbriatis, sepalis superioribus 10-12 ovatis obtusis integriusculis; petalis 12-13 oblongis **apice** crenulatis cuspidatis ex virescente roseis; stigmatibus 5-7. brevibus erectis compactis; bacca parva viridi sicca umbilico latissimo truncata squamis paucis subinde aculeiferis instructa flore marcescente demum deciduo coronata irregulariter ad folliculi modum lateraliter dehiscente; seminibus magnis obovatis obliquis minutim tuberculatis hilo magno ovato subbasilari, embryone circa albumen parcum fere circumvoluto hamato.

Var. B. minor: tota planta tuberculis, aculeis seminibusque minoribus.

Butte valley in the Utah desert and Ko-beh valley further west; fl. in May; fr. in July and August. Var. B comes from the Pikes Peak region. This and the New Mexican Echinocactus papyracanthus*

---

* The plant I formerly described as mamillaria papyracantha, Plant; Fendl. p. 49. Synops. Cact. p. 8, proves to belong to this section of Echinocactus; a closer examination of Mr Fendler's original specimen shows that the floral areola joins the spiniferous one at the apex of the small nascent tubercules, it is remarkable that, thus far Mr Fendler's specimen naked upwards, bearing strict, rather compact paniculate spikes

Ech. horridulus, Sem
Sem. and Ech.
form the small
Hamillaria (Thelo
Mex. Cact; Hort. C
closest and mo
sub-gen. Coryph
ng in the axils
and the spine
ove; in the M.
ddle of the tube
bidei they adva
, thus assumin
ey in the genus
t. 21; t. 25; f. 1;
also almost no
has only a few
ther hand the
ctus but never
and especially
the only one e
Echinocactus brevi
rule; here the
at the ba
distinct spinifer
Bound. t. 19
ngs, bearing strict

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

The Mexican Ech. horripilus, Lem. and perhaps the South American Ech. Odieri, Lem. and Ech. Cumingii Salm, and probably one or two others form the small section of Echinocactus. with the appearance of Mamillaria (Theloidei, tuberculis spiraliter dispositis distinctis, Salm. Cact; Hort. (Dyck. 1849. cult: p. 34.) They Constitute the closest and most imperceptible transition to Mamillaria Sub-gen. Coryphantha, Synops. Cact p. 8. which bear the flowers in the axils of the nascent tubercules, the flowerbearing and the spine bearing areolae being Connected by a woolly groove; in the M. macromeris, Englm. they come from the middle of the tubercule (Cact Boundary, t. 15. f. 4.) and in the Theloidei they advance to the top of the tubercule close to the spines, thus assuming the position which the flowers regularly occupy in the genus Echinocactus (see Cact. Bound. t. 20. f. 2; t. 21; t. 25 f. 1; t. 27. f. 1; t. 28. f. 2.)*

The ovary is also almost naked like that of Mamillaria generally or has only a few scales like that of M. macromeris is. On the other hand the dry fruit such as is often found in Echinocactus but never in Mamillaria, the tuberculated black seeds and especially the large and curved embrys

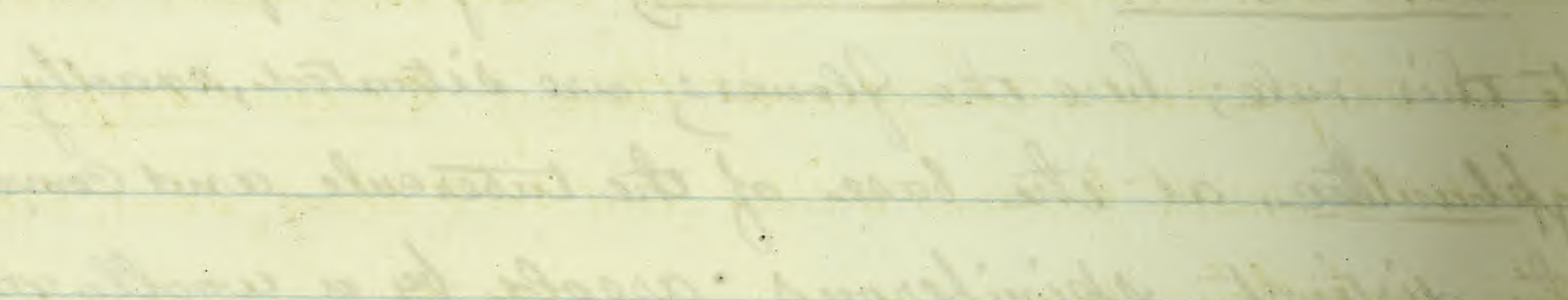
---

has remained the only one ever obtained of this pretty species.

★ Echinocactus brevihamatus Engelm. forms an exception to this rule; here the flowers are situated, exactly as in Coryphantha, at the base of the tubercule and connected with the distinct spiniferous areola by a woolly groove; See Cact. Bound. t. 19. f. 2 & 3.

naked upwards, bearing strict, rather compact paniculate spikes

sence of an al
aceus. This speci
that the general app
ally its real affinit
every appearance
ll its essential ch
C. Brand. p 27.
straight ribs; i
ry fruit, contain
turely the same a
Specimens of ours
ster, of dark green
spirals being most
r quadrangular
in the transverse
e 3-4 lines long, a
tubercules are rat
es long, whitish;
5-7 lines long), y
central spine.
es and only 1-1½ l
ith their compressed
shape and arran
the areola becomes
make their appearan
rangement; as descri
that late in the
on the vertex of
wards, bearing stri



and the presence of an albumen do not permit a separation from Echinocactus. This species is further interesting, because it again strikingly proves that the general appearance, the habitus, of a cactus plant not necessarily indicates its real affinities; not only is it a true Echinocactus notwithstanding every appearance of a Mamillaria, but it is, moreover, closely allied in all its essential characters to the very compact Ech. intertextus, Englm. C. Bound. p 27. t. 34, in which all traces of tubercules are lost in the straight ribs; it has the same small flowers and the same small dry fruit, containing few large seeds of similar structure though not entirely the same arrangement of the spines.

Full grown specimens of our plant are 3-5 inches high and 3-4 inches in diameter, of dark green colour; tubercules loosely arranged in $\frac{8}{21}$ or $\frac{13}{34}$ order, 8 and 13 spirals being most prominent; they are 6-8 lines long, at base somewhat quadrangular 6-7 lines wide in the vertical and 4-5 lines in the transverse diameter, becoming subcylindric upwards; areolae 3-4 lines long, a little more than half as wide. The fruit bearing tubercules are rather stouter and shorter. Exterior spines 4-6 lines long, whitish; interior ones spreading stouter and a little longer (5-7 lines long), yellowish and upwards deep brown or black; no truly central spine. In the very young plant the spines 18-20 in number and only 1-1½ lines in length, are all radiating closely fitting with their compressed bulbous bases on a linear areola, resembling in shape and arrangement those of Cereus Caespitosus; soon afterwards the areola becomes wider and 6 or 8 short, stout, brown, interior spines make their appearance, divergent like the original ones; next the ordinary arrangement, as described above takes place.

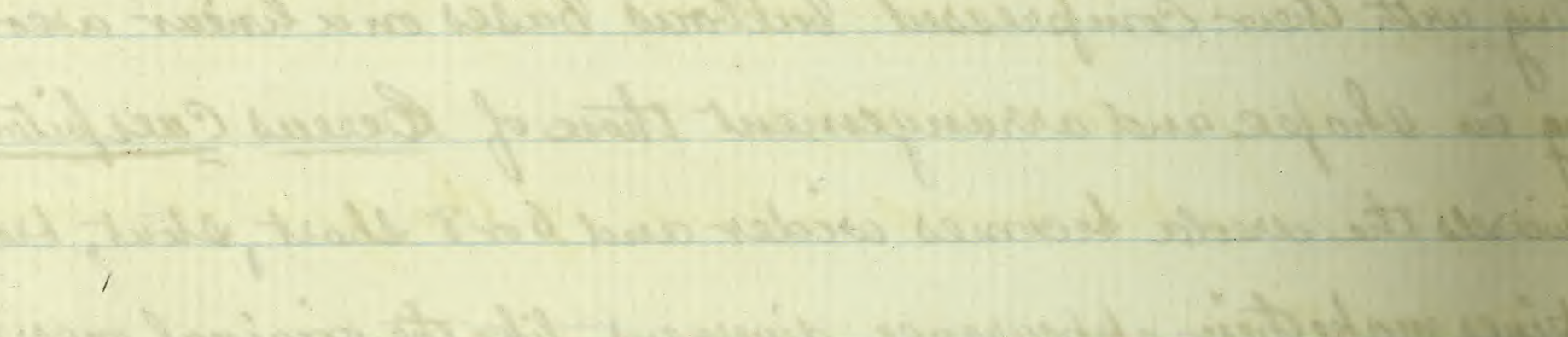
It seems that late in the fall or quite early in the spring the young tubercules on the vertex of the plant begin to form, exhibiting naked upwards, bearing strict, rather compact paniculate spike

woolly tops, and lon
wer, the tips of th
are 8–10 lines lo
ish purple, petals
short stamens aris
a very small nect
½ lines long and
eola, surrounded
its top 1–3 scale
y, The fruit usu
its base remains
r all? or only a
sal opening (see
ter, covered with
shows erect poin
to develop its f
B. has been rec
the smallest spec
ules in 8/21 order,
3 darker slender
the size of those of
13/34 or even 21/34 or
and 6 or 7 internal
species has been nam
edition.

Echinocactus H

the young grow
wool.

wards, bearing str



their densely woolly tops, and soon afterwards, long before any spines make their appearance, the tips of the smooth, brown flower buds come out.

The flowers are 8–10 lines long and of nearly the same diameter, externally greenish purple, petals yellowish green, or verging to pale purple. The short stamens arise from the whole surface of the tube, leaving only a very small nectariferous space in its base. The fruit is about 3 or 3½ lines long and almost as wide, born on a very large circular areola, surrounded by a woolly margin (see t. 2. f. 1.); it bears towards its top 1–3 scales, sometimes with 1 or 2 small spines in their axils, The fruit usually opens by an irregular lateral slit; falling off, its base remains attached to the areola, as is the case in many (or all? or only all the dry fruited?) Echinocacti, thus producing a basal opening (see t. 2 fig. 5). Seeds ~~1½~~ lines long in the longest diameter, covered with minute close set tubercules. The young seedling shows erect pointed Cotyledons and, when a few weeks old begins to develop its pubescent spines.

Var. B. has been recieved this fall from the Pikes Peak gold region; the smallest specimens were 1 inch in diameter, globose, the small tubercules in $\frac{8}{21}$ order, spines 1½ to 2 lines long, all recurved; sometimes 1–3 darker stouter ones in the centre. The larger specimens are almost of the size of those of Utah, but often depressed at top tubercules arranged in $\frac{13}{34}$ or even $\frac{21}{54}$ order; spines only 4–5 lines long 20–28 external and 6 or 7 internal ones.

This species has been named in honor of the gallant Commander of the expedition.

Plate 1 — Echinocactus Simpsoni as it appears in the fall; on the vertex the young growth of tubercules is visible their tops covered with wool.

naked upwards, bearing strict, rather compact paniculate spike

Details of the Sa

Four tubercules

ar, where the fruit h

ines, exhibiting the

. A detached tub

4- Flowers with the

5- The fruit, magn

ing; Fig. 6. the broa

7- A scale of this

12 Seed; 8; nectu

lateral, 10 dorsal,

highly magnified.

9- Embryo, envelo

also the albumen

14- Lateral, 15 f

15- Seedling, a fe

16- Tubercules of t

in every state of

Rubiginosus. (

compressis interruptis lu

curvatis albidis ap

ibus 1-2 robustioribu

brevioribus; aculeo c

rsito sursum hamato

Pleasant Valley

wards, bearing s

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

h 9

Plate 2 — Details of the same

Fig 1 — Four tubercules from near the vertex; one shows the broad scar, where the fruit has fallen off, another one is just developing its spines, exhibiting the points above the thick wool.

Fig. 2 - A detached tubercule bearing a ripe fruit.

Fig. 3 & 4 - Flowers with the upper part of the tubercule and its young spines.

Fig. 5 & 6 - The fruit, magnified 3 times; Fig 5 showing the basal opening; Fig. 6. the broad umbilicus

Fig. 7 — A scale of this fruit more magnified with 2 axillary spines.

Fig 8-12 Seed; 8; natural size, the others 8 times magnified; 9 lateral, 10 dorsal, 11 basal view; 12 part of the surface highly magnified.

Fig 13. - Embryo, enveloped in the inner seed coat, including also the albumen.

Fig. 14 — Lateral, 15 frontal view of the embryo, magnified.

Fig. 16 — Seedling, a few weeks old, magnified

Fig 17. — Tubercules of the smaller variety from Pikes Peak in every state of development.

Echinocactus subinermis. (Spec. nov.); parvulus turbinatus; costis 13 subobliquis compressis interruptis tuberculatis; areolis orbiculatis; aculeis brevibus rectis seusaepe curvatis albidis apice adustis velutinis demum nudatis; radialibus superioribus 1-2 robustioribus longioribus rectis curvatis seu hamatis, ceteris 5-8 brevioribus; aculeo centrali deficiente seu singulo robustiore longiore arrecto sursum hamato; flore? fructu?

Pleasant Valley near the Salt Lake Desert, found

naked upwards, bearing strict, rather compact paniculate spike

without flower o
compressed tuber
Ribs; radial
more so than
I find only 5-6
than the balan
10, one or more
hooked; at last
appearance, 5-6
or upwards. At
ith age the who
I find the spine
diating. I
to be an Echin
to the section Fl
Echinocactus W
W.t.1. Syn. Cact
is interruptis; ac
, reliquis longio
matis curvatis; ce
co flexuoso albo,
eu solum infi
aloideis 5 oblong
ranaceis integris
6-7 brevibus in
e squamata flo
wards, bearing st

May 9th without flower or fruit. — Stem 2 inches high, 1 or 1¼ in diameter; compressed tubercules 4-6 lines distant from one another; confluent in 13 ribs; radial spines 1-4 lines long, white pubescent or almost tomentose, more so than I have observed it in any other Cactus; on the lower areolae I find only 5-6 spines, the upper ones a little longer and stouter than the balance; farther upwards the number increases to 10, one or more of the upper ones becoming still stouter and often hooked; at last here and there a single central spine makes its appearance, 5-6 lines long, the strong hook always turned inward or upwards. At first only the dusky point of the spine is naked; with age the whole coating seems to wear off. In another specimen I find the spines 8-12 in number a little longer, more slender, all radiating. The small supra spinal areola proves this plant to be an Echinocactus; it probably belongs together with the next to the section Hamati Synops Cact p. 15.

Echinocactus Whipplei, Engelm. and Bigelow, Cact. Whipp. p. 28. t. 1. Syn. Cact. p. 15. Var spinosior: globosus; costis 13 compressis interruptis; aculeis radialibus 9-11, inferioribus saepe obscurioribus, reliquis longioribus raveis, 2 superioribus saepe elongatis complanatis curvatis; centralibus 4, summo elongato complanato pergamentacco flexuoso albo, 3 reliquis paullo brevioribus obscuris omnibus; seu solum infimo hamatis; floribus minoribus; evario squameis sepaloideis 5 oblongis munito; sepalis tubi linearibus margine membraneaceis integris mucronulatis; petalis angustis oblongis; stigmatibus 6-7 brevibus in capitulem globosum congestis; bacca ovata parce squamata floris rudimentis persistentibus coronata.

naked upwards, bearing strict, rather compact paniculate spikes

The species wa
Bigelow and wa
ory; the variet
further north in
fruits with the
concealed bete
been drawn. —
ines ½ — 1½ in
flowers if I m
h long; ovary s
lower triangula
ordate or auric
cuis; sepals of
5 or 6 lines lon
apparently an
bed and figure
he seed coat a
m, each formin
surface of an
tubercle itself;
ous albumen.

wards, bearing str

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

The species was originally discovered on the little Colora=
do by Dr. Bigelow and was found afterwards on the same stream by
Dr. Newberry; the variety, here described, was met with more than
5 degrees further north in Desert Valley, west of Camp Floyd;
remains of fruits with the withered flowers attached, and some seeds
were found concealed between the spines, from which the descrip=
tion has been drawn. — Globose heads 3 inches in diameter,
radial spines 1/2 — 1 1/2 inches long, central ones 1 1/2 — 2 inches
in length; flowers if I may judge from the withered remains,
about 1 inch long; ovary small, bearing about 5 membraneaceous
scales, the lower triangular, the upper oblong linear, almost entire,
and never cordate or auriculate at base, as they are in most of
the allied species; sepals of tube also narrow, linear, or oblong —
linear 2 — 5 or 6 lines long 1/2 - 1 line wide; stigmas about 1/2 line
long. Fruit apparently an oval berry 1/2 inch long; seed just as
it is described and figured in Whipple's Cactaceae; the tub=
ercles on the seed coat are extremely minute and distant from
one another, each forming a central protuberance on the other=
wise flat surface of an angular cell of 2 or 3 times the diame=
ter of the tubercle itself; embryo curved about 3/4 around a
rather copious albumen.

naked upwards, bearing strict, rather compact paniculate spikes

Cereus viridiflorus

...t. 36; Synops. C...

...Upper Platte; it is ...

...3 inches high, 13-ri...

...ign some branches ...

...tributed without m...

...d the lateral ones ...

...all the rest white ...

...variations sometim...

...tle reliance can ...

- Central spin...

...ards, white or tippe...

Cereus Engelmar...

...t. Bound. p. 36.

...to flower or fruit. ...

...s of the Boundar...

...westwardly to Ar...

Opuntia Sphaero...

...Syn. Cact. p. 44.

...natis, crassis, junior...

...natis subulatis diva...

...parvulis seu hinc in...

...ris oborato areolis ...

...versis obcordatis c...

...ius exserto; stigmati...

...ata; seminibus nu...

...Bass, west of Steptoe ...

...1/8" in flower and fru...

...over 1/2 inch in thick...

...wards, bearing s...

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Cereus viridiflorus, Engelm. in Wisliz. Mem. note 8, sub Echinocereo; Cact. Bound. t. 36; Synops. Cact. p. 22. This is evidently the northernmost Cereus, extending to the upper Platte; it is abundant in the Pikes Peak region. These northern specimens are 1–3 inches high, 13-ribbed and show the greatest variability in the color of the radial spines; in some bunches they are all red, in others white, in others again the colors are distributed without much regularity; sometimes the upper and lower spines are white and the lateral ones red, or a few or even a single one above and below are red and all the rest white, or the lower ones are red and the upper ones white, and all these variations sometimes occur on the same specimen. I mention this to show how little reliance can be placed on the colors or the distribution of the colors of the spines. — Central spines wanting or 1 or 2 projecting horizontally, straight or curved upwards, white or tipped with purple or all purple, 6—9 lines in length.

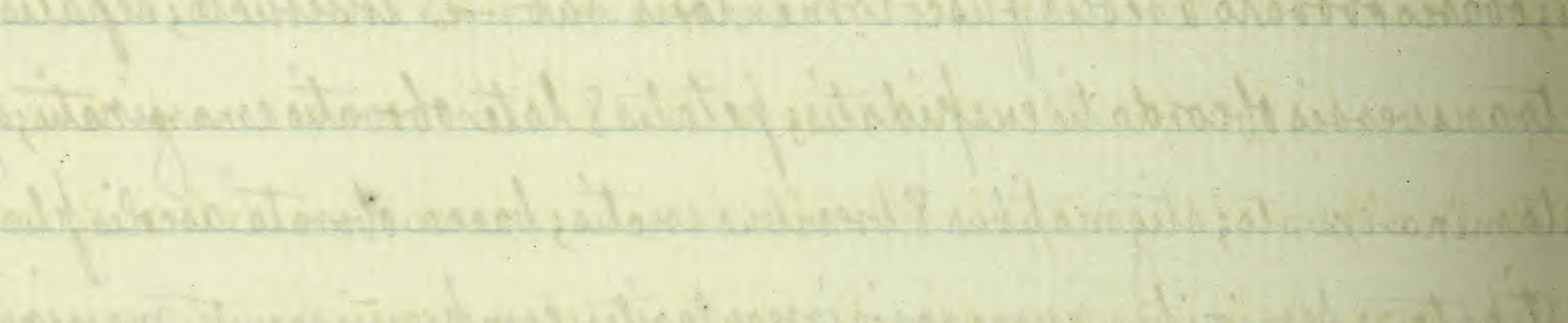
Cereus Engelmanni, Parry in Sillim. Journ. II. ser. 14. p. 338; Engelm. Cact. Bound. p. 36. t. 67; Synops. Cact. p. 27. Deserts west of the Salt Lake, without flower or fruit. — Specimen entirely similar to the one figured in the Cactaceae of the Boundary. The species seems to extend from the Salt Lake region southwestwardly to Arizona and the Mohave country.

Opuntia sphaerocarpa, Engelm. & Bigelow Cact. Whipp. p. 47 t. 13. f. 6–7; Syn. Cact. p. 44. Var.? Utahensis: diffusa, lacte-viridis; articulis orbiculato-obovatis, crassis, junioribus saepe globoso-obovatis; areolis subapproximatis; foliis minutis subulatis divaricatis; setis brevissimis paucis stramineis; aculeis nullis seu parvulis seu hinc inde singulo longiore recto robusto albido; floribus sulphureis; ovario obovato areolis fusco tomentosis sub-25 instructo; sepalis exterioribus transversis obcordatis cuspidatis; petalis 8 late obovatis emarginatis; stylo vix supra stamina exserto; stigmatibus 8 brevibus erectis; bacca obovata areolis pluribus tomentosis stipata; seminibus numerosis irregulariter compressis anguste marginatis.

Pass, west of Steptoe Valley in the western Mountains of the Basin, found on July 19th in flower and fruit. — Joints 2–3 inches long and of almost the same diameter; often over ½ inch in thickness, sometimes almost terete or rather egg

naked upwards, bearing strict, rather compact paniculate spike

...ut 6 or 8 lines a pa...
...in any other of ou...
...lorado. Bristles ...
...on the upper area...
...length. Flowers re...
...ish; fruit about 1...
...areolae which some...
...4 or in the largest
...number of ill-defi...
...ies known to me, t...
...pico though its fr...
...the specimen befo...
...if we might not su...
...the season would
...been entirely too mu...
...ers of O. sphaeroc...
Opuntia tortispi...
...forks of the Platte;...
...have that this is the
...ars to be somewhat sm...
...and rather weaker; bi...
...ght belong; unfortun...
...state, 2 lines long; fl...
...1½ inches), with 20
...bristles; exterior se...
...circulate; stig...
Opuntia hystricina
...A flowering specim...
...ietty like one found
...wards, bearing s...



shaped; areolae 6 or 8 lines apart; leaves very slender and acute, scarcely 1 line long, smaller than in any other of our species except O. basilaris, also a western form, from the lower Colorado. Bristles few and even in old joints scarcely more than ½ line long; spines none or on the upper areolae a few short ones with here and there a stouter one 3/4 – 1 inch in length. Flowers nearly 3 inches in diameter, pale or sulphur yellow; when fading reddish; fruit about 1 inch long and half as wide with a deep umbilicus and with 20-25 areolae which sometimes show a few bristles or a minute spine; spines very irregular, 2 or in the largest diameter sometimes 2½ lines wide. — Unwilling to increase the number of ill defined species in this most difficult genus I attach this plant to the only species known to me, to which it possibly can be compared, O. sphaerocarpa from New Mexico though its fruit is not spherical, has not a shallow umbilicus and is, at least in the specimen before me, not dry; the latter would be an insuperable distinction, if we might not suspect, what in fact, is often the case, that the fruit later in the season would become dry and brittle. The leaves, which heretofore have been entirely too much neglected as a diagnostic character in this genus and the flowers of O. sphaerocarpa are unknown,

Opuntia tortispina, Engelm. & Bigelow l.c. p. 41. t. 8. f. 2-3; Syn. Cact. p. 37. Forks of the Platte; in flower in July. – The specimens being very incomplete, I am not quite sure that this is the same species as that of Capt. Whipple's Expedition, the joints appear to be somewhat smaller, the areolae closer together and the spines shorter (1-1½ inches) and rather weaker; but I do not know any other species east of the Mountains to which it might belong; unfortunately the fruit, which would decide, is unknown. Leaves subulate, 2 lines long; flowers 2½-3 inches in diameter, sulphur yellow; ovary long (1-1½ inches), with 20-30 areolae with light brown wool and short bright brown bristles; exterior sepals obovate, lance cuspidate; petals 6-8, broadly obovate, obtuse, crenulate; stigmas 6-8, short, erect, as long as the stamens.

Opuntia hystricina, Engelm. & Bigelow l.c. p. 44. t. 15. f. 5-7; Syn. Cact. p. 43. – A flowering specimen, collected in June between Walker and Carson Rivers, is exactly like one found by Dr. Bigelow on the Colorado Chiquito; it has naked upwards, bearing strict, rather compact paniculate spike

straighter spines t

somewhat to O. c

s, half as wide, o

stored bristles; lon

ewish red sp

3 inches in diamete

4 or 5 sepals oblance

obtuse, crenulate

The squarrose

Opuntia Missouri

ort.); Cactus ferox, Ri

specimens without p

lar; areolae closely

Opuntia Missouricen

n. Bact. p. 44. — D

July. — By their

ers. — Below ens 3

to 200 or 25 areolae, s

crenulate; style

flowers have elongate

Opuntia fragilis,

p. 45; Cactus frag

Country, in flower

flowers of this spec

port that the plan

ountains, but tha

since many years D

Bayden, but have

hat the flowers are

wards, bearing

slenderer and straighter spines than the one figured in Whipple's Report, and approaches somewhat to O. erinacea, Eng. & B. of the Mohave region. — Joint 3 inches long, half as wide, obovate; leaves 1½ lines long; areolae closely set, with long straw colored bristles; lower ones with few and short white spines, upper ones with numerous grayish red spines, 1½–2 inches in length. Flowers pale straw colored, 2½–3 inches in diameter; ovary 1 inch long with 20–30 white woolly aculeolate areolae; exterior sepals oblanceolate, squarrose or recurved at the elongated tips; petals obovate obtuse, crenulate; style with 8 or 10 short erect stigmas, longer than the stamens. — The squarrose tips of the sepals are particularly conspicuous on the bud.

Opuntia Missouriensis De Cand. Prod. 3. p. 472; Torr. & Gray, Fl. 1. p. 555 (in part); Cactus ferox, Nutt. Gen. 1. p. 296. — From the deserts of Salt Lake Valley to Rush Valley; specimens without flower or fruit. — Joints small (2–3 inches long) broadly obovate or circular; areolae closely set; spines numerous, stiff, stout, angular, white, mostly deflexed.

Opuntia Missouriensis, var. albispina, Engelm. & Bigelow l. c. p. 476; t. 14 f. 8–10; Syn. Cact. p. 44. — Smith creek, Lookout Mountains, in western Utah; flowering in July. — By their slender flexuous spines the specimens approach to var. trichophora. — Flowers 3–3½ inches in diameter; bright golden yellow; ovary 1 inch long with 20 or 25 areolae, scarcely spiny; exterior sepals obovate cuspidate; petals about 8, obtuse, crenulate; style shorter than the stamens, stigmas about 5, very short, erect. Some flowers have elongated and very spiny ovaries, evidently abortive.

Opuntia fragilis, Haworth Suppl. p. 82, Torr. & Gray, Fl. 1. p. 555; Synops. Cact. p. 25; Cactus fragilis, Nutt. Gen. 1. p. 296. — Fort Kearny to the North Platte Country, in flower in June and July. This is, I believe, the first time that the flowers of this species were collected, since Nuttall's discovery of it in 1813. — Travellers report that the plant is very frequently seen in the sterile prairies east of the Rocky Mountains, but that it is rare to find them in flower and rarer still in fruit. Since many years I have the plant in cultivation from specimens brought down by Dr. Hayden, but have not been able to get it to flower. Nuttall only informs us that the flowers are solitary and small. On the specimen, before me, [illegible] naked upwards, bearing strict, rather compact paniculate spike

...ng, scarcely 2 inche...
...overed with thick...
...roadly oval with a...
...the stamens; stig...

...through the kind...
...imens and fruit of...
...tinct southern spec...
Opuntia Ges Con...
Am. Acad. Arts & Sc...
...s; articulis passim o...
...gillibus; pulvillu...
...curvis; areolis f...
...llerisque aculeos...
...tibus, infimis ine...
...ucos fusco-vill...
...obovatis cuspidat...
...ante, stigmatibus...
...in pulpa viscos...
...lantibus.

Barren sandy p...
...ng, obovate, tumi...
...one on top of the o...
...les, separating as...
...leaves 2½-3½ or...
...divergent like...
...Military gentlem...
...epals and petals...
...½ inch long with...
...upwards, bearin...

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

1572
m

they are yellow, scarcely 2 inches in diameter; ovary 8–9 lines long, the 13–15 areolae are densely covered with thick white wool, the upper ones bear a few white spines; lower sepals broadly oval with a short cusp; petals 5, obovate, rounded, crenulate; style longer than the stamens; stigmas 5, short, erect, cuspidate. *

---

* (~~Note~~) Through the kindness of Dr. A. W. Chapman of Apalachicola, Fla. I have received living specimens and fruit of O. Ges Corvi, so that I can now complete the description of this very distinct southern species.

Opuntia Ges Corvi, Le Conte in herb. Engelm. append to Synops. Cact. in Proceed. Am. Acad. Arts & Sc. 3. p. 346; Chapman, Fl. South. U. S. p. 465: diffusa lacte viridis; articulis parvis ovatis seu obovatis tumidis saepius teretiusculis con-catenatis fragilibus; pulvillis subdistantibus pulvinatis; foliis teretiusculis ovatis cuspidatis incurvis; areolis junioribus albotomentosis setas parcas brevissimas pallidas et plerisque aculeos 1–3 rectos rigidos saepe basi compressos tortos ve obscuros gerentibus, infimis inermibus; floribus flavis minoribus; ovario obovato pulvillos per-paucos fusco-villosos gerente; sepalis exterioribus ovato-lanceolatis, interioribus obovatis cuspidatis; petalis sub-5 obovatis spatulatis obtusis; stylo stamina aequante, stigmatibus 4–5 erectis; seminibus paucissimis anguste obtuseque marginatis in pulpa viscosa baccae parvae rubrae saepe floris rudimentis coronatae nidulantibus.

Barren sandy places along the coast of Georgia and Florida. Joints 1–3 inches long, obovate, tumid, or narrower and cylindric, fresh or dark green, usually growing one on top of the other, forming chains often 1 or 2 feet long, at last prostrate; joints fragile, separating as readily as in O. fragilis; tumid pulvilli 4–6 or even 8 lines apart; leaves 2½–3½ or 4 lines long, incurved; spines 1–1½ inches long, very straight, when in threes, divergent like the "crows foot" used against cavalry, whence the name given by the military gentleman who discovered this species. Flowers 1½–1¾ inches in diameter, sepals and petals less numerous and narrower than in any allied species; ovary about ½ inch long, with only 2 or 3 areolae on the surface and 3–5 on the upper naked upwards, bearing strict, rather compact paniculate spike

Opuntia pulche

[illegible] minutis e basi

[illegible]dum longiorem c

[illegible]entibus; floris p

[illegible]tis dense stipa

[illegible]ribus spatulatis; p

[illegible]linearibus subere

Sandy deserts on

the prettiest speci

Bot. p. 46) of the

small joints and pur

inches long, 4–6 li

[illegible] crowded, white

[illegible]d somewhat roug

long; flowers of a beau

[illegible]meter; ovary 4–5

[illegible]areola; style not

[illegible]llow.

Fig. 1. Part of a pla

natural si

Fig. 2–4. Bunches of

Fig. 5. Section of a

Fig. 6. A leaf from an

[illegible]ut obovate, 6–7 lines

[illegible]ained remains of the

[illegible] at most 6 seeds,

[illegible]g obtuse rim. By its p

[illegible]and fragile joints se

[illegible]pwards, bearing

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Opuntia pulchella (spec. nov.): parvula diffusa; articulis parvis obovato-clavatis; foliis minutis e basi ovata subulatis; areolis confertis, superioribus aculeos albidos rectos, singulum longiorem complanatum porrectum seu deflexum, ceteros brevissimos radiantes gerentibus; floris purpurei ovario areolis 13–15 convexis albo-villosissimis et longe setosis dense stipato; sepalis inferioribus lineari-oblongis breviter cuspidatis, superioribus spatulatis; petalis sub-8 obovatis obtusis; stylo cylindrico exserto stigmatibus 5 linearibus suberectis.

Sandy deserts on Walker River; fl. in June. This is one of the smallest as it is one of the prettiest species of this genus. It belongs to the small section of Clavatae (Synops. Cact. p. 46) of the cylindric opuntiae but is distinct from all those known to me by its small joints and purple flowers; all the others, have as far as I know yellow flowers. Joints 1–1¼ inches long, 4–6 lines thick, very slightly tuberculated; leaves scarcely 1 line long; areolae crowded, white woolly; larger central spine on the upper areolae 4–6 lines long, flat and somewhat rough above, convex below; smaller ones 4–6 or 10, radiating ½ to 1½ lines long; flowers of a beautiful bright purplish red, or deep rose red color, 1¼–1½ inches in diameter; ovary 4–5 lines long, beset with white capillary spines, 3–5 lines long, 15–20 on each areola; style not ventricose, as is usual in the genus, but cylindric; stigmas slender, pale yellow.

Plate 3. Fig. 1. Part of a plant, of Opuntia pulchella, showing a flower bud and two flowers; natural size.

Fig. 2–4. Bunches of spines, 4 times nat. size.

Fig. 5. Section of a larger spine, more magnified.

Fig. 6. A leaf from an ovary, with the axillary woolly and bristly areola, 4 times nat. size.

---

margin. Fruit obovate, 6–7 lines long, rose purple, with a shallow umbilicus, often crowned with the blackened remains of the flower; areolae almost obliterated; red pulp very glutinous, including 1–3 or at most 5 seeds, which are very regularly shaped, lenticular, with a narrow but thick and very obtuse rim. By its pulpy fruit this species is widely removed from O. fragilis to which by its turnid and fragile joints seem to ally it; nor can it be confounded with any other species

naked upwards, bearing strict, rather compact paniculate spike

(a) Linosyris g

Asteraceae, gen. 2.

bush, is common

es of the Missouri

Mexico; it crosse

to extend far ea

~~surface~~, in ea

shrubs.

Though qu

different varieties

thickness, very sli

branches, densely co

dant clusters of ye

The specim

d the same form a

Var. filifolia

ifpa convexis falli

This shrub gr

of the stem is dar

it is smooth and

ked with numero

easily separable

ldegreen and d

narrow, thickish

ting smaller upw

gin, spreading, a

upwards, bea

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Compositae

(72) Sinosyris graveolens, Torrey and Gray, Fl. N. Am. 2. p. 234; Chrysocoma graveolens, Nuttall, gen. 2. p. 136. This handsome shrub, now known under the popular name of Rabbit bush, is common along the eastern slope of the Rocky Mountains from the upper waters of the Missouri, along the Yellowstone River, the upper Platte and down to New Mexico; it crosses the Mountains into Oregon (Nuttall) and Utah but does not appear to extend far westwardly. It usually grows in large patches of ~~masses together~~, ~~covering many acres of ground~~, in creek and river bottoms ~~as well as on~~ and rarely on sterile hills, often together with the sage-brushes.

Though quite variable in the shape and coating of the leaves and stems, and according to Nuttall (l. c.) even 8 feet high all the different varieties of this species grow 3-5 feet high, forming stems of 3 or 4 inches in thickness, very similar to the Sage stems, with numerous more-or-less erect broom-shaped branches, densely covered with narrow leaves and topped in August and September by abundant clusters of yellow flowerheads.

The specimens before me have been collected on Black's Fork of Green River, and the same form is said to be common over a great part of ~~eastern~~ Utah. I distinguish it as:

Var. filifolia: glabrata; foliis lineari-filiformibus crassiusculis supra canaliculatis infra convexis pallidis.

This shrub grows about ~~4-6~~ 5 feet high; the stems become 3 or 4 inches thick; the bark of the stem is dark gray and finally scales off in narrow shreds; on the smaller branches it is smooth and white. The soft wood is very light brown or grayish, with white sap, marked with numerous medullary rays; the annual rings are very distinct and apparently easily separable, scarcely more than 1/3 line thick. The young branches are very pale green and smooth and are subdivided into numerous branchlets, crowded with very narrow, thickish, pale-green leaves, from 3/4 to 1 3/4 inches long and 1/2 to 3/4 lines wide, getting smaller upwards, channeled above, rounded on the underside, entire on the margin, spreading, and, when old, often somewhat recurved. The numerous naked upwards, bearing strict, rather compact paniculate spikes

leads terminate the
low yellow flowers.
or 3 lines in diame
and consists of about
ty glutinous on the
ose nearly 5 lines
rium is crowned
ng as the corolla;
ter of the widened

Var. tomentosa

of Sweetwater Rive
leaves and by the le

Wrights rev. 11
t. & f. p. 80., is stile
the tube of the
tubes shorter than
ines, or is the diser
ific importance

Var. glabrata:

Thus I charact
linear; thinner
it was found by Dr.
ably be the original
Clarke brought fro

All the forms of
bear the name.

Another very rea
upwards, bearin

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

clustered heads terminate the fastigiate branches, covering the whole bush with a profu-sion of golden yellow flowers. The heads, born on pedicels of unequal length, are 6 lines long and 2 or 3 lines in diameter above, tapering to the base. The involucrum is 4 lines long and consists of about 3 series of very unequal scales, dry and shining, keeled and often slightly glutinous on the back and somewhat rough on the margins. The flowers, 5 in number, are nearly 5 lines long and protrude 1/3 or 1/2 over the involucrum. The silky-haired ovarium is crowned by a pappus of numerous capillary unequal bristles al-most as long as the corolla; the linear spreading lobes of the corolla are longer than the diameter of the widened, almost funnel shaped tube.

Var. tomentosa; S. graveolens var. B. Torr. & Gr. l. c. was found near the mouth of Sweetwater River. It is characterized by the soft white pubescence of the stem and leaves and by the leaves being more erect and often longer and broader than in the last form.

Wrights nro. 1184 from the lower part of New Mexico, noticed in Gray's Pl. Wright. 2. p. 80., is still more densely covered by a silky white tomentum, has larger flowers with the tube of the corolla longer than the pappus, ventricose upwards, the connivent lobes shorter than the diameter of the throat. Can this possibly be a distinct species, or is the direction and proportion of the teeth or lobes of the corolla of little specific importance in these plants?

Var. glabrata: glabra, foliis lanceolato-linearibus planis laete virentibus.

Thus I characterize a shrub 4-6 feet high, with flat, darker green, lanceolate-linear, thinner leaves, narrower tube and shorter, more erect lobes of the corolla. It was found by Dr. Hayden covering the bottoms of the Yellowstone River. This may possibly be the original Chrysocoma dracunculoides, Pursh, Fl. 2. p. 517, which Lewis and Clark brought from the banks of the Missouri; The name would not be inappro-priate.

All the forms of this species have a heavy rather unpleasantly aromatic smell, whence the name.

Another very nearly allied species was also collected by the Expedition. It is naked upwards, bearing strict, rather compact paniculate spike

Linosyris pumila, Gr
Trans. Am. Phil. S
Syn. p. 389; on Swee
ngos. It is always a
the broader ones (1½
and very acute; the
and soft pubescenc
spinulose-serrulat
always rough upwar
d, smaller than in
ner scales of the involu
lobes of which are st
Brinitaria viscidi
Torrey & Gr. l.c. p. 232
to be identical with t
but high with very gla
same as my var. gle

[illegible]
wards, bearing stra

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

1912

Linosyris pumila, Gray in Pl. Wright, 2. p. 80, note; Chrysothamnus pumilus, Nutt. in Trans. Am. Phil. Soc. (n. ser.) 7. p. 323; Linosyris serrulata, Torr. in Stansb. Rep. p. 389; on Sweetwater River, at Bridger's Pass and in the valley of the Timpanogos. It is always a low shrub 6-12 inches high; leaves flat, oblanceolate-linear, the broader ones (1½-2 lines wide, 1-1¼ inches long) distinctly 3-nerved, all rigid and very acute; the upper surface more or less scabrous, the lower covered with a very fine and soft pubescence or naked; the margin always roughly ciliate or (under a glass) spinulose-serrulate. The stem is roughly pubescent or more or less glabrous below, always rough upwards. The heads in the specimens before me, are 3 or 4-flowered, smaller than in the last species; the flowers scarcely protrude beyond the inner scales of the involucrum; the pappus is nearly as long as the corolla, the spreading lobes of which are slender and longer than the diameter of the throat.

Crinitaria viscidiflora, Hooker Fl. Bor. Am. 2. p. 24; Linosyris viscidiflora, Torrey & Gr. l. c. p. 234, is said by the latter authors and by Gray (Pl. Wright (l. c.) 2. p. 80, note) to be identical with this species, but Hooker distinctly states, that it forms a shrub 2-4 feet high with very glabrous, single-nerved and entire leaves. Gray is therefore not be the same as my var. glebrata of L. graveolens.?

G. Engelmann

naked upwards, bearing strict, rather compact paniculate spike

The name of "Wild S
was first used by Lew
to several species of Art
ish-gray foliage and as
restricted to the larger
of Western North Am
furnishing the sole artic
deserts", as already
Fl., p. 142. The States
luviensis, which name
ana, described by
Gray, in their Flora
page" of those travel
mmately applied to se
by Gov. Lewis to Cu
homeward voyage
I have now the pl
from Dr. G. M. Hayde
Dimportance for bo
Artemisia cana, Pu
p. 418. Shrubby, with
Yellowstone, Dr. Ha
mm). Stem covere
of loose shreds co
wood light, porous, p
sting along the divis
line in thickness, a
wards, bearing s

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

The name of "Wild Sage", now so familiar to every traveller in our western moun-
-tain — deserts, was first used by Lewis and Clark in the narrative of their adventurous expedi-
-tion, to designate several species of Artemisia or Wormwood, distantly resembling the true Sage,
Salvia, by their gray foliage and aromatic odor. It seems that now this name has, by com-
-mon use, been restricted to the larger shrubby species, which give a peculiar character to the
arid plateaus of Western North America, and which are of the highest importance to the
traveller as "furnishing the sole article of fuel or shelter, which they meet in wandering over
these woodless deserts", as already Nuttall informs us in his Genera of North Americ-
-can Plants, 2, p. 142. He states that the Wild Sage, properly so called, is his Arte-
-misia Columbiensis, which name was by him improperly substituted for the prior
name of A. cana, described by Pursh from the original specimens of Lewis and Clark.
Torrey and Gray, in their Flora of N. America 2. p. 418 doubt whether this really
is the "Wild Sage" of those travellers, and come to the conclusion that that name
was indiscriminately applied to several shrubby species; they farther state that the
plant, given by Gov. Lewis to Pursh as the Sage, is the herbaceous A. Ludoviciana,
found on the homeward voyage on the Missouri River.

I have now the means through information obtained from Dr. H. Engel-
-mann and from Dr. F. V. Hayden to throw a little more light on this question, which
is not without importance for botanical geography. The two species here in question are:

Artemisia cana, Pursh, Fl. Am. Sept. 2. p. 521; Torrey and Gray, Fl.
N. Am. 2. p. 418. Shrubby, with woody stem 2 – 4 inches in diameter, 2- 4
feet (on the Yellowstone, Dr. Hayden) or 2 – 6 feet high (on the Laramie plains,
H. Engelmann). Stem covered with a light gray bark which is separated into
many layers of loose shreds connected by smaller transverse fibres, and is readily
torn off. Wood light, porous, pale colored, with very many darker medullary rays,
easily separating along the division of the annual rings. These rings or layers are
from $\frac{1}{4}$ to 1 line in thickness, as stems of $1\frac{1}{2}$ or 2 inches diameter show about a dozen

naked upwards, bearing strict, rather compact paniculate spike

consequently as
but mostly compres
ed from the base, but
~~of from the base t~~
annual branchlets
long, densely coa
th silvery gray h
numerous short-an
heads, forming
hort-leaves. The le
mes) rarely lobe
per ones becoming
arly so, hemisphe
of involucrum e
mes longer than th
flowers, brownish
f. The flowers a
in number, 1½ lin
dor of wormwood
is the Wild Sage
) and the Yellowst
t seem to occur i
dy state; and Nu
hen he contends
of the Columbi

Tanisia tridentata
; Torrey and Gra
that of the la
twisted and k
branches, which
branchlets; ultim
hes long, canes e
pwards, bearing

rings, and are consequently as many years old. The stems are rarely cylindrical, but mostly compressed, knotty and variously twisted, often stunted; they are sometimes divided from the base, but oftener bear a few stout and thick branches higher up.

~~Immediately from the base they divide into numerous branchlets of 1/4 inch thickness.~~ The annual branchlets are crowded along the older branches, 8 to 12 inches long, densely coated with a soft white pubescence and crowded with silvery gray leaves, and bear towards their upper part and on the numerous short and erect lateral branchlets a profusion of small flower heads, forming a spiked or contracted panicle, interspersed with short leaves. The leaves are flat, linear-lanceolate, entire or (the lower ones) rarely lobed, 1–2 or 2½ lines wide and 1½–2 inches long, the upper ones becoming smaller. The flower heads are mostly sessile or nearly so, hemispherical, about 2 lines long and wide; outer scales of involucrum shorter foliaceous and canescent (sometimes the lowest ones longer than the flowers and pointed); inner scales nearly as long as flowers, brownish, scarious, obtuse, cottony-fimbriate on the margins. The flowers are all perfect, usually 5, in some species as many as 8 in number, 1½ lines long; ovary glandular and when bruised with the odor of wormwood.

This is the Wild Sage of the Upper Missouri (above the mouth of the Yellowstone) and the Yellowstone Rivers, and of the Laramie Plains, but it does not seem to occur west of the Rocky Mountains, as Torrey and Gray (l. c.) already state; and Nuttall (l. c.) must have confounded it with other species, when he contends that it is "still more abundant on the barren plains of the Columbia River", and that it grows 6 to 8 or 12 feet high.

Artemisia tridentata, Nuttall in Trans. Amer. Phil. Soc. (n. ser.) 7. p. 398; Torrey and Gray Fl. 2. p. 418. Trunk, bark and wood very similar to that of the last species, but trunk often larger and usually even more twisted and knotty; with very numerous short and ~~straggly~~ stunted branches, which are repeatedly divided into a great many smaller branchlets; ultimate annual branchlets fascicled, erect, only 3–6 inches long, canescent or silvery, very leafy at base, rather naked upwards, bearing strict, rather compact paniculate spikes

of sessile or u
or 8 sessile hea
r the base of the
ile branches;
btuse tridenta
less distinct
ence interspers
te obtuse lea
long, not mu
inescent exter
n the sides.
uch head, all
ite glandular
This is the Wil
est of the Ro
tern A. cana
out a foot high,
ually 2 to 4 feet hig
~~often 6 or 8 feet~~
(small bushes) hav
is also found
e, but there
more common
bearing while
or, undoubtedly
the other species
densis, Michx.,
or, Bridgers Pass,
twater, and A.

would add to the
ter, the Artemisia
circumference in
The branches a
ster of the bu

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

22 Cr

composed of sessile or usually pedunculate spikelets or glomerules of 3 to 6 or 8 sessile heads. Leaves silvery white on both surfaces, crowded at the base of the branches and often fascicled on short or stiolated sterile branches; narrowly wedge-shaped 1½–2 lines wide at the obtuse tridentate or trilobed end, narrowed down into a more or less distinct petiole; usually 3–6, rarely 8 lines long.

Inflorescence interspersed with short and narrow undivided cuneate or spatulate obtuse leaves. Heads of flowers narrow, obovoid, nearly 1½ lines long, not much more than half as wide, with short and obtuse, canescent exterior scales and larger scarious interior scales, ciliate on the sides. Flowers in some specimens 3, in others often 4–5 in each head, all perfect scarcely more than 1 line long; ovary quite glandular and with the odor of turpentine.

This is the Wild Sage of Utah and perhaps of the whole region west of the Rocky Mountains, where it seems to supplant the more eastern A. cana. Nuttall, who first described it, calls it a shrub about a foot high, but in Utah it is the largest and most abundant species (usually 2–4 feet high, rarely as much as 6 feet, & then not straight ~~often 6 or 8 feet high~~ and with trunks of 3–6 inches diameter. (Sometimes the small bushes have a stout trunk as thick as the forgestones, & stout & chunky) It is also found east of the mountains, on the range of A. cana, but there, ever remains an inconspicuous shrub, lost among the more common species. Near Camp Floyd specimens were collected bearing white, tomentose, excrescences, of the size of a pea or larger, undoubtedly caused by the sting of insects.

The other species of Artemisia, collected by the expedition, were A. Canadensis, Michx., at Bridgers Pass; A. Ludoviciana, Nutt., at Sweetwater, Bridgers Pass, Round Prairie &c; A. Dracunculoides, Pursh, on the Sweetwater, and A. Frigida, Willd., on the upper Sweetwater.

~~G. Engelmann.~~

Capt. S. would add to the above that he has seen in one locality on the Sweetwater, the Artemisia as much as 8 feet high and its branches aggregating a circumference in the bush of about 8 feet or showing a diameter of 2½ feet. The branches at their base were as much as 6 inches in diameter, & the trunk nearly or quite a foot.

0 1 2 3 4 5 6 7 8 9 10 cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Ch

lus vermicular
niculata, Hooke
ini, Nees in
ubert, in Bot
nd. Jour. Bo
Fremont's fir
mont's second
Pl. Gambel p.
.p. 169; in
orn or pulpy
ent travellers a
curious and in
on clayey soil, w
ne plains) and
souri (Dr. Hay
mann) and u
, to the plains
), Utah (Frem
Engelmann) o
and noticed
19) this shru
American Fl
ssed by him t
by Nees in
of Nemacle
latus, and
ublication by
. It is a g
priority; thoug
ian shrub
wood of the
ity have comm
ey to the mi
and value th

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

2350

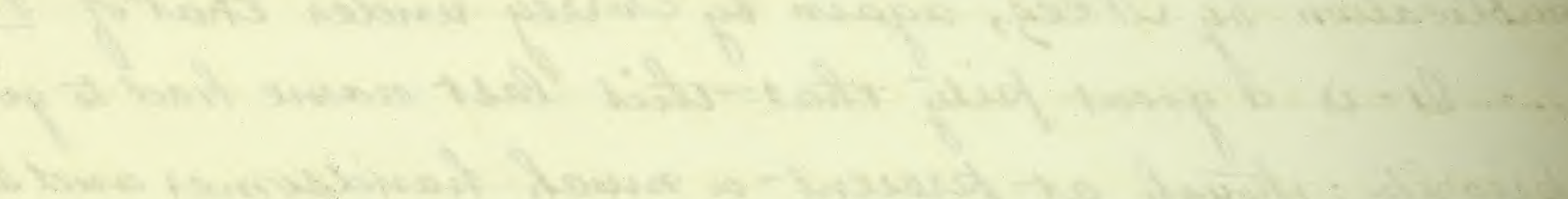
Chenopodiaceae

Sarcobatus vermicularis, Torrey in Emory's Report (1848) p. 149; Batis vermiculata, Hooker, Fl. Bor. Am. 2. p. 128. (1840); Sarcobatus Maximiliani, Nees in Pr. Maximil. trav. engl. ed. p. 6-18 (ex Torrey); Seubert, in Bot Zeitung, 1844. p. 753, cum. tab. Lindly in Hooker. Lond. Jour. Bot. IV. p. 1 (1845); Fremontia vermicularis, Torrey in Fremont's first Report. 1843, reprint 1845, p. 96; and Fremont's Second Report 1845 p. 317, tab. 3; Sarcacanthus, Nuttall, Pl. Gambel p. 184; Sarcobatus vermicularis, Torrey in Gilgr. Rep. p. 169; in Stansb. Rep. p. 394; in Bot. Whipple, p. 130. Pulpy thorn or pulpy leafed thorn of Lewis and Clark; Greasewood of the present travellers and settlers,

This curious and important plant is found ~~in clayey soil~~ on the (principally on clayey soil, which in the wet season is moist) (often covering large patches) arid saline plains and the borders of salt lakes from below Fort Pierre on the Missouri (Dr. Hayden) to the upper Platte river (Fremont, H. Engelmann) and upper Canadian (Dr. James) east of the Rocky Mountains, to the plains of the Columbia (Lewis and Clark, Douglas, Fremont), Utah (Fremont, Stansbury) through the basin to Carson Valley (H. Engelmann) and down to the Gila River (Emory). Though discovered and noticed by Lewis and Clark (1804) and collected by Dr. James (1819) this shrub was first described (1840) by Hooker in his North American Flora from Oregon Specimens, and was doubtfully referred by him to Batis. A few years later it was again described by Nees in his account of the plants collected by the Prince of Neuwied as a new genus, under the name of Sarcobatus, and very soon afterwards and without a knowledge of the publication by Nees, again by Torrey under that of Fremontia. It is a great pity that this last name had to give way to priority; though at present a much handsomer and showy Californian shrub bears Fremont's name, the wide spread Greasewood of the western mountains and deserts would more fitly have commemorated the bold and hardy pioneer explorers to the millions who now do, or in time to come will know and value this shrub.

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

greasewood
In Utah it is g
or 8 feet high
rtly, flattened,
ings & are so
d of decayed
or slightly
compact of
th very thin
ones ¼ of a
0-25 rather
years old. The
white bark
ese spines are
ter ones are re
g tear leaves o
rminated by a
The other spi
spike, which
hes long, son
lateral spe
ondary axilla
hich constitutes
the flower bear
re often narro
channeled on t
least towards
ff. They are
line, or somet
g and vigorous
ader, almost-
; in specimens
covered with a
ves are sometim
mmonly alterna



The greasewood forms a scraggy, stunted shrub, (In Utah it is commonly 3–4 high.) 2 or 3 to as much as 6 or 8 feet high. (and rarely 3) The stems are scarcely ever more than 1 or 2 inches thick, knotty, flattened, twisted, and often with irregular ridges and holes (the scars of decayed branches). (Sometimes they are so straight as to be used by the Indians for arrows.) They are covered with a compact, smoothish or slightly roughened light gray bark. The wood is very hard and compact of light-yellow, in the core light brownish color, with very thin annual layers, in younger plants about $\frac{1}{3}$ in older ones $\frac{1}{4}$ of a line or less thick. The oldest stems seen showed 20–25 rather indistinct rings, and were consequently so many years old. The numerous smaller branches have a smooth, shining, white bark and are beset with white spines at right-angles; these spines are indurated branches of two kinds. The sharper and shorter ones are real spines, scarcely ever more than $\frac{1}{2}$–1 inch long; they bear leaves only or in the axils of these female flowers, and are terminated by a sharp point, and never by a staminate spike. The other spines are branchlets which did bear such a terminal spike, which after flowering has fallen away; they are 1–2 inches long, sometimes even longer, when they are apt to bear also lateral spines. The flower-bearing branches are very often secondary axillary productions closely under the sterile primary branch, which constitutes the spine, so that the spines often appear as axillary to the flower bearing branches. The leaves are thick and pulpy linear, or often narrowed towards the base, flattened or even slightly channeled on the upper surface and keeled on the lower one, at least towards the base, leaving a triangular scar after falling off. They are $\frac{1}{2}$–1 inch, rarely as much as $1\frac{1}{2}$ inches long, and $\frac{1}{2}$ line, or sometimes in the upper half even 1 line wide; in young and vigorous shoots I have seen the leaves flatter, shorter and broader, almost lanceolate. Their surface usually is perfectly glabrous; in specimens from Carson Lake, however, I find the younger leaves covered with a rough and sometimes branched pubescence. The leaves are sometimes, on the lower part of the branches, opposite but commonly alternating in $\frac{2}{5}$ order ⟶

The stamina
ry different
on the sa
t-stamina
g are crow
the branch
long and
rhombic s
th of 5–9
een the sep
lar scales
anthers
lly. The
leaves and
er just bel
ch spri
gated on
the flowers
, investi
two uneq
h the fru
ng, 3–5
rounds
tical sec
diameter,
monstrate
The greas
The for
me of
f the plan
cious flo
the grea
dioecious
dioecious

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

25 X cc

The staminate and pistillate flowers are both very imperfect, but very different in their arrangement and structure; they usually occur on the same plant, though some plants seem to bear scarcely any but staminate, others only pistillate flowers. The staminate flowers are crowded into a deciduous spike or ament, terminating the branches. This spike is, before the flowers open, 3–5 lines long and 1½ lines thick, and very compact, exhibiting only the rhombic surfaces of the scales; afterwards it elongates to the length of 5–9 lines, showing the deciduous anthers under and between the separated scales. The spike consists of 25–35 peltate angular scales, pointed at the upper end, which cover 3–5 broadly oval anthers sessile on the rhachis, ½ line long, 2-celled opening laterally. The fertile flowers are usually solitary in the axils of the leaves and sessile; in some specimens I find a secondary flower just below the primary one and sometimes even below a branch springing from the same axil; sometimes they are aggregated on abbreviate branchlets forming irregular clusters.

The flower consists of a tubular calyx with an inconspicuous rim, investing the lower half of the ovary, which is terminated by two unequal tubulate stigmas, lateral in regard to the stem.

In the fruit this rim is enlarged to a broad circular spreading wing, 3–5 lines in diameter, green or sometimes red which surrounds the upper third of the fruit. The flattened vertical seed, inclosed in the membranaceous utriculus, is about one line in diameter, and contains a spiral embryo without an albumen, as already demonstrated and figured by Prof. Torrey in Fremont's Report.

The Greasewood is found in flower from June to August.

The form from Carson Lake seems to be distinguished ~~under the name of var. puberula~~, not only by the pubescence of the younger parts of the plant, but also by its more squarrose growth, its subdioecious flowers and its aggregated fertile flowers and fruits; the greasewood is, however, in other localities also often subdioecious, so that when first described it was considered a truly dioecious plant

S. Engelmann.

(1) Sp

...mis numerosissi...

...breviata bis te...

...d ramuloram bi...

...ra squamam ...

...emineis brevis...

...ina includent...

...culis squama...

&

"common in m...

Th...

...served to attain...

The grayish bar...

...nearly white, ...

...guished and ap...

½–2 inches lo...

...least one year old...

...flexed leaves are...

...rous membrane...

...branches leaves a...

...at the base of the...

...with young shoo...

The staminate...

...in length, cons...

...each one bearin...

...gina with a...

7

26. 7

Coniferae

(The printer is requested to follow exactly the punctuation of copy in the Latin.)

(0) Ephedra pedunculata, nov. spec.: dioica fruticosa squarrosissima; ramis ramis numerosissimis verticillatis fasciculatis; foliis oppositis subulatis divaricatis vaginis abbreviata bis terve longioribus deciduis; amentis oppositis seu plerumque verticillatim ad ramulorum basin aggregatis; masculis breviter pedunculatis ovatis, perigonio supra squamam membranaceo-marginatam exserto, antheris biloculatibus sub-8; femineis brevius longiusve pedunculatis, squamis 6 basi per paria connatis ovula bina includentibus; seminibus (non plane maturis) ovatis obtuse trigonis obtusi usculis squamas intimas subcarnosas paullo (quarta parte fere) superantibus.

Sandy and Saline deserts near Walker River, western Utah and "common in many parts of Utah".

This shrub grows usually ~~about 3 feet~~ from 2 to 4 feet high, but has occasionally been observed to attain a height of 5 or 6 feet. The largest stems seen had a diameter of 4 inches. The grayish bark finally separates into very fine, almost capillary, fibres. The wood is nearly white, rather compact but not hard; the annual layers are not easily distinguished and apparently less than ½ line thick. The joints in vigorous specimens are 1½–2 inches long, but sometimes much shorter; the flower bearing branches (always at least one year old) are rather stout, ¾–1 line thick. The subulate divaricate but not reflexed leaves are (from their insertion) 2½–3½ or 4 lines long, united at the base by a scarious membrane and thus forming a sheath ¾–1 line in length; on the flower bearing branches leaves and sheaths have entirely disappeared. The aments are usually crowded at the base of the numerous verticilate branches or on their lowest joints, and are interspersed with young shoots. Male and female flowers are always separated on different stems. The staminate aments, on a naked peduncle about 1 line long, are oval 4–5 lines in length, consist of 6 or 8 or even 10 pairs of fleshy membranaceously margined scales, each one bearing in its axil (as is the character of the genus) a compressed membraneous vagina with a transverse slit at the obtuse apex emitting the column of filaments

usually bear
born on very
-nal 4-celled
of the seed be
several pairs
they are naked
middle.
or 3 vaginae
The seeds
flattened on
obtuse perf
protrudes.
lines long and
¼ its length

ts, but in no

by Prof. Cor
Wright n
-ulate from
shorter, ½ t
along the br
lines long, co
scarcely pr
4 lines long,
-gin; the
over the scal
from Sarec
at the base

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

usually bearing 8 anthers or sometimes less; the 4 lower anthers are sessile, the upper ones are born on very short stipes; they are usually 2-celled, once or twice only have I noticed a terminal 4-celled anther. Pollen grains lanceolate even after being moistened. The peduncles of the seed bearing aments are usually 2, but sometimes even 3 or 4 lines long; they have at base several pair of very small, rudimentary scales, and are articulated just above them, otherwise they are naked, but on very long peduncles I observe another pair of scales about the middle. The ament itself always consists of 3 pairs of fleshy scales, united at base, or 3 vaginae as they are commonly termed, the uppermost being by far the largest. The seeds I find almost invariably in pairs, only once I have seen a single one; they are flattened on the inside, obtusely keeled on the back, with an oval outline, and with a rather obtuse perforated point, from which like a style the elongation of the inner seed coat protrudes. The seeds (those at my disposal are not fully ripe) are rather over 3 lines long and the whole ament is about 4 lines long, the seed protruding not more than about 1/4 its length beyond the innermost scales.

E. Andina, E. Helvetica and a few other species have pedunculed aments, but in none is the peduncle as long as in this species.

E. antisyphilitica, Berlandier, at least the specimens described by Prof. Torrey in the Botany of the Mexican Boundary, page 207, from above El Paso (Wright nro. 1883) have less crowded branches, leaves in twos or usually in threes, subulate from a broad base, spreading or recurved, as long as their common sheath or shorter, 1/2 to at most 1 line long; aments closely sessile, not crowded, generally in pairs along the branches, rarely in fours; staminate ones subglobose or short oval, 3-4 lines long, consisting of 5 or 6 or rarely 7 pairs of floriferous scales; perigonial vagina scarcely protruding above its scale; anthers 4-5 or 6. The fruit bearing ament, about 4 lines long, is composed of 5 or 6 pairs of scales which are membranaceous on the margin; the seed, usually single, is acuminate and protrudes 1/3 or even 1/2 its length over the scales. It is not quite certain that this is the same as Berlandier's plant from Laredo, which is described by C. A. Meyer as having the sessile aments crowded at the base of the numerous fasciculate branches, like our E. pedunculata.

0 1 2 3 4 5 6 7 8 9 10 cm
copyright reserved
MISSOURI BOTANICAL GARDEN

doubtingly in
(see also Sorre
south of Sant
stouter plant
always in thr
the elongated
Wright's nu
in the Brez. C
the branches
2½ lines long
aments have
very curious,
remain dou
-dra- (such

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

28 aa 7

A third western species "from the Del Norte and the Gila" has been doubtingly indicated by Prof. Torrey in Emory's Report p. 15-2 under the name of E. trifurca (see also Torrey in Stansb. Rep. p. 395). Dr. Wislizenus has collected the same from Valverde, south of Santa Fé, New Mexico, in the year 1846, but also without flower or fruit. It is a stouter plant, with stricter growth erect verticillate branches, joints about 1½ inches long leaves always in threes, subulate, very sharply pointed, strictly erect, 2 lines long, shorter than the elongated sheath (2–3 lines long) or of the same length, somewhat persistent. Wrights nrs. 1884 from the country above El Paso, which has been described by Torrey in the Mex. Bound. Botany p. 208, is the same plant; the aments are sessile in pairs along the branches or in clusters at their base; the male aments are small and globose (about 2½ lines long) shorter than the persistent but lacerate sheaths and leaves; the female aments have been described by Torrey; their stiped, membranaceous, shining scales are very curious, but whether their shape is owing to a monstrosity, as suggested, must remain doubtful, as the ovulum seems to be perfect. Several other species of Ephedra (such as E. alata, E. Comatolepis) have also alate scales.

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

(Plates to be inserted as follows)

Page 29

Plate I, Append. III

Echinocactus Simpsoni

Page 30

Plate II, Append. III

Echinocactus Simpsoni

Page 31.

III Appendix III

Opuntia pulchella.

Missouri Botanical Garden
George Engelmann Papers

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
Missouri Botanical Garden

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN